

What is claimed is:

- 1 1. A partially thio-modified aptamer that binds to a TGF-beta protein.
- 1 2. The aptamer of claim 1, wherein the TGF-beta protein comprises a human TGF-beta.
- 1 3. The aptamer of claim 1, wherein the TGF-beta protein comprises a TGF-beta dimer.
- 1 4. The aptamer of claim 3, wherein the TGF-beta dimer is a homodimer.
- 1 5. The aptamer of claim 4, wherein the TGF-beta homodimer is a TGF-beta 1, 2 or 3 homodimer.
- 1 6. The aptamer of claim 3, wherein the TGF-beta dimer is a TGFbeta 1, 2 or 3 heterodimer.
- 1 7. The aptamer of claim 1, wherein the aptamer comprises one or more thio-modifications as set forth in SEQ ID NOS: 4-22.
- 1 8. The aptamer of claim 1, wherein the aptamer is achiral.
- 1 9. The aptamer of claim 1, wherein the aptamer further comprises a detectable label.
- 1 10. The aptamer of claim 1, further comprising one or more pharmaceutically acceptable salts.
- 1 11. The aptamer of claim 1, further comprising a diluent.
- 1 12. A partially thio-modified aptamer that binds to a TGF-beta receptor.
- 1 13. The aptamer of claim 12, wherein the TGF-beta receptor is a signaling receptor.
- 1 14. The aptamer of claim 12, wherein the TGF-beta receptor is a co-receptor.
- 1 15. The aptamer of claim 13, wherein the TGF-beta signaling receptor comprises a human TGF-beta signaling receptor.
- 1 16. The aptamer of claim 13 wherein the TGF-beta signaling receptor comprises a TbetaRI or a TbetaRII receptor.

- 1 17. The aptamer of claim 13, wherein the target of the aptamer is the GS domain of a
- 2 TbetaRI receptor.
- 1 18. The aptamer of claim 14, where the co-receptor is TGF-beta 3.
- 1 19. The aptamer of claim 12, wherein the aptamer is achiral.
- 1 20. A partially thio-modified aptamer that binds to a ligand-receptor complex comprising a
- 2 TGF-beta ligand and a receptor complex comprising a TbetaRI and a TbetaRII receptors.
- 1 21. The aptamer of claim 20, wherein the target of the aptamer is the GS domain of a
- 2 TbetaRI receptor.
- 1 22. The aptamer of claim 20, wherein the aptamer is achiral.
- 1 23. A partially thio-modified aptamer that binds to a ligand binding trap capable of trapping
- 2 TGF-beta ligands.
- 1 24. The aptamer of claim 23, wherein the ligand binding trap comprises decorin, latency-
- 2 associated protein (LAP) or alpha-macroglobulin.
- 1 25. The aptamer of claim 23, wherein the aptamer is achiral.
- 1 26. A partially thio-modified aptamer that binds to an auxiliary protein that promotes
- 2 binding of TGF-beta ligand to Tbeta signaling receptors.
- 1 27. The aptamer of claim 26, wherein the auxiliary protein is a SARA protein.
- 1 28. The aptamer of claim 26, wherein the aptamer is achiral.
- 1 29. A partially thio-modified aptamer that binds to a Smad protein.
- 1 30. The aptamer of claim 29, wherein the Smad protein is an R-Smad, a Co-Smad, an I-Smad
- 2 or a combination thereof.
- 1 31. The aptamer of claim 29, wherein the aptamer is achiral.
- 1 32. A partially thio-modified aptamer that binds to a TGF-beta protein complex and
- 2 enhances TGF-beta activity.

- 1 33. The aptamer of claim 32, wherein the binding site of the aptamer on the TGF-beta
- 2 protein complex comprises a region of a ligand binding trap protein.
- 1 34. The aptamer of claim 32, wherein the binding site of the aptamer on the TGF-beta
- 2 protein complex comprises a region of an inhibitory I-Smad.
- 1 35. The aptamer of claim 32, wherein the aptamer is achiral.
- 1 36. A partially thio-modified aptamer that binds to a TGF-beta protein complex and inhibits
- 2 TGF-beta activity.
- 1 37. The aptamer of claim 36, wherein the binding site of the aptamer on the TGF-beta
- 2 protein complex comprises a region of an R-Smad or a Co-Smad.
- 1 38. The aptamer of claim 36, wherein the aptamer is achiral.
- 1 39. A partially modified thioaptamer that inhibits TGF-beta activity by binding to a TGF-
- 2 beta ligand, a TGF-beta ligand-Tbeta receptor complex, a TGF-beta signaling receptor and co-
- 3 receptor, to an R-Smad or a Co-Smad.
- 1 40. The aptamer of claim 39, wherein the aptamer is achiral.
- 1 41. A partially modified thioaptamer that modifies TGF-beta activity by binding to a TGF-
- 2 beta ligand, a TGF-beta ligand-Tbeta receptor complex, a TGF-beta signaling receptor and co-
- 3 receptor, to an R-Smad or a Co-Smad.
- 1 42. A method of inhibiting TGF- $\beta$  activity comprising the steps of:
  - 2 providing to a host in need of therapy a pharmaceutically effective amount of a thioaptamer that
  - 3 specifically binds to and inhibits TGF- $\beta$  activity.
- 1 43. The method of claim 42, wherein the thioaptamer is provided to the host to ameliorate
- 2 the effects of: fibrosis, scarring and adhesion during wound healing; fibrotic diseases of the
- 3 lung, liver and kidney; atherosclerosis, arteriosclerosis; cancers including gliomas, colon cancer,
- 4 prostate cancer, breast cancer, neurofibromas, lung cancer; angiopathy, vasculopathy,
- 5 nephropathy; systemic sclerosis; viral infections accompanied by immune suppression (HIV,
- 6 HCV); and immunological disorders and deficiencies (auto-immune diseases).

1 44. A method of quantitating TGF- $\beta$  levels in a sample comprising the step of contacting a  
2 sample with a TGF- $\beta$ -specific thioaptamer.

1 45. The method of claim 44, wherein the samples comprises a physiological sample.

1 46. The method of claim 44, wherein the sample comprise a blood, tissue, cells, supernatant,  
2 media.

1 47. The method of claim 44, wherein the TGF- $\beta$  protein comprises a human TGF- $\beta$ .

1 48. The method of claim 44, wherein the TGF- $\beta$  protein comprises a TGF- $\beta$  homodimer.

1 49. The method of claim 44, wherein the TGF- $\beta$  protein comprises a TGF- $\beta$ 1, 2 or 3  
2 heterodimer.

1 50. The method of claim 44, wherein the thioaptamer comprises one or more thio-  
2 modifications as set forth in SEQ ID NOS.: 4-22.

1 51. The method of claim 44, wherein the thioaptamer further comprises a detectable label.

1 52. The method of claim 44, wherein the thioaptamer further comprises a detectable  
2 detectable selected from the group consisting of a colorimetric, a fluorescent, a radioactive and  
3 an enzymatic agent.

1 53. A method of modulating TGF- $\beta$  signaling comprising the steps of:

2 administering to a host a TGF- $\beta$  specific thioaptamer that modulates the activity through the  
3 TGF- $\beta$  receptor in a dosage effective to reduce activity of the TGF- $\beta$ .

1 54. The method of claim 53, wherein the thioaptamer modulates the activity through the  
2 TGF- $\beta$  receptor by increasing activity.

1 55. The method of claim 53, wherein the thioaptamer modulates the activity through the  
2 TGF- $\beta$  receptor by decreasing activity.

1 56. The method of claim 53, wherein the thioaptamer is selected from the group consisting  
2 of SEQ ID NOS.:4-22.

1 57. A method of treating a pathological condition due to increased TGF- $\beta$  activity  
2 comprising the steps of:

3 administering to a host an effective dosage of a thioaptamer that modulates TGF- $\beta$ .

1 58. The method of claim 57, wherein the thioaptamer binds to TGF- $\beta$ , the TGF- $\beta$  receptor, a  
2 TGF- $\beta$  auxiliary protein, a TGF- $\beta$  ligand binding trap protein or a TGF- $\beta$  Smad protein.

1 59. The method of claim 57, wherein the thioaptamer modulates the activity through the  
2 TGF- $\beta$  receptor by increasing activity.

1 60. The method of claim 57, wherein the thioaptamer modulates the activity through the  
2 TGF- $\beta$  receptor by decreasing activity.

1 61. The method of claim 57, wherein the thioaptamer is selected from the group consisting  
2 of SEQ ID NOS.: 4-22.

1 62. The method of claim 57, wherein the pathological condition comprises:

2 fibrosis, scarring and adhesion during wound healing; fibrotic diseases of the lung, liver and  
3 kidney; atherosclerosis and arteriosclerosis; cancers such as gliomas, colon cancer, prostate  
4 cancer, breast cancer, neurofibromas, lung cancer; angiopathy, vasculopathy, nephropathy;  
5 systemic sclerosis; viral infections accompanied by immune suppression (HIV, HCV); and  
6 immunological disorders and deficiencies (auto-immune diseases).

1 63. The method of claim 57, wherein the TGF- $\beta$  specific thioaptamer is encapsulated.

1 64. The method of claim 57, wherein the capsule is degradable by an external stimulus to  
2 release the TGF- $\beta$  specific thioaptamer.

1 65. The method of claim 57, wherein the external stimulus is selected from the group  
2 consisting of UV light, acid, water, in vivo enzymes, ultrasound and heat.

1 66. The method of claim 57, wherein the TGF- $\beta$  specific thioaptamer is bound to a binding  
2 molecule.

1 67. The method of claim 57, wherein the TGF- $\beta$  specific thioaptamer is bound to a binding  
2 molecule and further comprising the step of detaching the binding molecule from the TGF- $\beta$   
3 specific thioaptamer.

1 68. A method of treating a pathological condition in which increased TGF- $\beta$  activity has  
2 been implicated comprising the steps of:

3 administering to a host a TGF- $\beta$  specific thioaptamer in a pharmaceutically acceptable carrier at  
4 a dosage effective to reduce TGF- $\beta$  activity.

1 69. The method of claim 68, wherein the pharmaceutically acceptable carrier is selected  
2 from the group consisting of a cream, gel, aerosol and powder for topical application.

1 70. The method of claim 68, wherein the pharmaceutically acceptable carrier is selected  
2 from the group consisting of a sterile solution for injection, irrigation and inhalation.

1 71. The method of claim 68, wherein the pharmaceutically acceptable carrier comprises a  
2 sterile dressing for topically covering a wound.

1 72. The method of claim 68, wherein the pharmaceutically acceptable carrier is selected  
2 from the group consisting of a biopolymer and a polymer for implanting within a wound.

1 73. The method of claim 68, further comprising the step of administering a growth factor  
2 other than TGF- $\beta$ .

1 74. The method of claim 68, wherein the TGF- $\beta$  specific thioaptamer is encapsulated.

1 75. A method of modulating TGF- $\beta$  signaling comprising the steps of:

2 administering to a host a TGF- $\beta$  ligand binding trap specific thioaptamer that modulates the  
3 activity through the TGF- $\beta$  receptor in a dosage effective to reduce activity of the TGF- $\beta$ .

1 76. A method of modulating TGF- $\beta$  signaling comprising the steps of:

2 administering to a host a TGF- $\beta$  auxiliary protein specific thioaptamer that modulates the activity  
3 through the TGF- $\beta$  receptor in a dosage effective to reduce activity of the TGF- $\beta$ .

1 77. A method of modulating TGF- $\beta$  signaling comprising the steps of:

- 2 administering to a host a TGF- $\beta$  Smad protein specific thioaptamer that modulates the activity
- 3 through the TGF- $\beta$  receptor in a dosage effective to reduce activity of the TGF- $\beta$ .